

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE CLAIMS

Claims 1-3, 5, 11, 13 and 19 have been amended to more clearly recite the features of the present invention.

More specifically, claim 1 has been amended to recite a recording head including a nozzle through which ink is jetted onto a recording medium, and an ultraviolet ray irradiation device including an ultraviolet ray light source which generates an ultraviolet ray to cure the ink after it is jetted onto the recording medium to form an image. In addition, amended claim 1 recites that the ultraviolet ray irradiation device comprises a cover member arranged to cover the ultraviolet ray light source, and that the cover member has a plurality of interior surfaces exposed to the ultraviolet ray light source, wherein a first one of the surfaces is situated relative to the ultraviolet ray light source and the recording head such that ultraviolet rays are reflected by the first surface to the nozzle of the recording head. Still further, amended claim 1 recites means arranged in connection with the first surface for reducing the reflectance of ultraviolet rays from the ultraviolet ray light source to the nozzle of the recording head such that the reflectance of

ultraviolet rays by the first surface is lower than the reflectance of ultraviolet rays from remaining surfaces of the cover member.

Claim 3, moreover, has been amended to recite that the means comprises an ultraviolet ray absorbing member for absorbing ultraviolet rays which is arranged on the first surface of the cover member which is perpendicular to the recording medium and is distant from the recording head such that the surfaces of the cover member which are exposed to and which reflect ultraviolet rays from the ultraviolet ray light source have a variable absorbability of ultraviolet rays.

Independent claim 11 has been amended to recite a recording head including a nozzle from which ink is jetted toward a recording medium and an ultraviolet ray irradiation device including an ultraviolet ray light source and arranged to radiate an ultraviolet ray from the ultraviolet ray light source to cure the ink after it is jetted on the recording medium. In addition, amended claim 11 recites that the ultraviolet ray irradiation device comprises a cover member arranged to cover the ultraviolet ray light source, which is open toward a recording surface side of the recording medium, and which comprises an orthogonal surface portion approximately perpendicular to the recording surface, and which reflects ultraviolet rays from the ultraviolet ray light source to the nozzle of the recording head, and an

opposite surface portion having a region opposed to at least the recording surface. Still further, amended claim 11 recites means arranged in connection with the orthogonal surface portion for reducing the reflectance of ultraviolet rays from the ultraviolet ray light source to the nozzle of the recording head such that the reflectance of ultraviolet rays by the orthogonal surface portion is lower than the reflectance of ultraviolet rays from the opposite surface portion.

Claim 13, moreover, has been amended to recite that the means comprises an ultraviolet ray absorbing member arranged on the orthogonal surface portion and configured to include a material which absorbs the ultraviolet ray radiated from the ultraviolet ray light source such that the surface portions of the cover member which are exposed to and which reflect ultraviolet rays from the ultraviolet ray light source have a variable absorbability of ultraviolet rays.

Claim 19 has been amended to recite that the recording head is a serial head system or a line scan head system.

And new claim 20 has been added to recite additional features of the means for reducing reflectance, as supported by the disclosure in the specification and drawings.

No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered.

THE PRIOR ART REJECTION

Claims 1-3, 6, 7, 9, 11-14, 17 and 19 were rejected under 35 USC 103 as being obvious over US 2003/0035037 ("Mills et al"); and claims 8 and 18 were rejected under 35 USC 103 as being obvious over Mills et al in view of USP 6,232,361 ("Laksin et al"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

According to the present invention as recited in amended independent claim 1, means are arranged in connection with a first surface of the cover member for reducing the reflectance of ultraviolet rays from the ultraviolet ray light source to the nozzle of the recording head such that the reflectance of ultraviolet rays by the first surface is lower than the reflectance of ultraviolet rays from remaining surfaces of the cover member. Similarly, according to the present invention as recited in amended independent claim 11 means are arranged in connection with an orthogonal surface portion of the cover member (perpendicular to the recording surface) for reducing the reflectance of ultraviolet rays from the ultraviolet ray light source to the nozzle of the recording head such that the reflectance of ultraviolet rays by the orthogonal surface portion is lower than the reflectance of ultraviolet rays from a surface portion of the cover member which has a region opposed to the recording surface.

For example, as shown in Fig. 4 of the present application, the cover member 16 covers ultraviolet ray light sources 15, and since the cover member 16 is open at the bottom to the recording medium 17, ultraviolet rays are unavoidably reflected by the side of the cover member 16, which is distant from the recording head 6, against the recording medium and specifically against the nozzle 5 of the recording head 6. Since reflectance of ultraviolet rays to the nozzle 5 causes problems (as described in the specification at page 2, line 5 to page 3, line 15), such reflectance is reduced in accordance with the claimed present invention by providing means for reducing the reflectance of ultraviolet rays in connection with the surface from which such ultraviolet rays would be reflected to the nozzle of the recording head. As recited in claims 3 and 13, for example, the means may comprise an ultraviolet ray absorbing member arranged. And it is respectfully pointed out that reducing reflectance of ultraviolet rays from the ultraviolet ray light source to the nozzle of the recording head provides significant advantages, such as preventing the bodying and the curing of ink on the nozzle to achieve stable jetting of the ink. See the disclosure in the specification at, for example, page 38, line 26 to page 39, line 13.

It is respectfully submitted that Mills et al does not disclose means arranged in connection with a surface of the cover

member for reducing reflectance of ultraviolet rays, and moreover a surface which reflects ultraviolet rays from an ultraviolet ray light source to a nozzle of a recording head.

Mills et al describes a printing system including ultraviolet ray light sources 1012 which cure ink jetted from recording heads 1010 (see Fig. 18B). Each light source 1012 is housed in a lamp housing 104 and a lens 1016 is arranged in the lamp housing 1014 for focusing the ultraviolet rays on the recording medium 32. The Examiner therefore asserts that the reflectance of surfaces of the lamp housing 1014 perpendicular to the substrate 32 which are not covered by the lens 1016 is lower than the ultraviolet ray reflectance of the lens 1016.

However, Mills et al does not include any material or structure on a surface of the lamp housing 1014, which acts to reduce reflectance of ultraviolet rays from the ultraviolet ray light sources 1012 to the nozzles of the recording heads 1010. Therefore, Mills et al cannot disclose, teach or suggest the means for reducing reflectance of ultraviolet rays as according to the present invention as recited in amended independent claims 1 and 11.

Still further, it is respectfully submitted that Mills et al also clearly does not disclose, teach or suggest the feature of claims 3 and 13 whereby an ultraviolet ray absorbing member provides the surfaces or surface portions of the cover member

which are exposed to and which reflect ultraviolet rays from the ultraviolet ray light source with a variable absorbability of ultraviolet rays, i.e., higher where the absorbing member is present relative to portions where it is not present.

In the Office Action, the Examiner asserts that the lamp housing 1014 of Mills et al is made of materials which absorb ultraviolet rays such as plastic and steel. However, there is no ultraviolet ray absorbing member in Mills et al which is arranged on an interior surface of the lamp housing 1014. And it is respectfully submitted that the composition of the lamp housing 1014 in Mills et al provides a uniform reflectance of ultraviolet rays and there is no additional ultraviolet ray absorbing member which enables variable absorbability.

In view of the foregoing, it is respectfully submitted that the present invention as recited in amended independent claims 1 and 11, and claims 2-10 and 12-20 depending therefrom, clearly patentably distinguishes over Mills et al, taken singly or in combination with Laksin et al, under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

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